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### **Remarks/Arguments**

Applicant respectfully requests favorable reconsideration of the subject application, particularly in view of the above amendment and the following remarks. There is no additional fee for the above amendment as the number of independent claims and the total number of claims for consideration has been reduced.

Applicant has amended the specification at pages 7 and 8 to incorporate the generic terminology for the registered trademarks NAFION (a sulfonated tetrafluoroethylene copolymer) and TEFLON (polytetrafluoroethylene).

Applicant has amended Claim 1 of the subject application to include the limitation that at least one of the proton conductive material and the electron conductive material of the claimed anode catalyst layer comprises lignin. This amendment is fully supported, for example, at Page 11, lines 10-12, where it is indicated that the proton conductive material is selected from the group consisting of, among other things, ligno-sulfonic acid and at Page 12, lines 1-4, where it is indicated that, in accordance with one embodiment of this invention, the electron conductive material comprises a grafted polymer comprising polyaniline grafted to lignin. Accordingly, Applicant respectfully urges that this amendment is fully supported by the application as originally filed and, thus, incorporates no impermissible new subject matter into the application.

Applicant has amended Claim 9, line 2, by incorporating the word "said" before the word lignin so as to indicate the existence of an antecedent basis therefor. Similarly, Applicant has amended Claim 10, line 2 by deleting "a" and in its place inserting "said" so as to indicate the existence of an antecedent basis for the term "proton conductive material". Applicant has amended Claim 12 to correct an obvious typographical error by adding a period at the end of the claim.

Finally, Applicant has amended the claims to indicate that Claims 15-39 have been withdrawn from further consideration as the result of a restriction requirement imposed on the application by the Examiner.

The Examiner asserts that the specification includes terminology that is so different from that which is generally accepted in the art to which the invention pertains that a proper search of the prior art cannot be made. In support of this contention, the Examiner has cited the terms "ligno-" and "lignin" and has required clarification or correlation with art-accepted terminology so that a proper comparison can be made with the prior art. The Examiner asserts that the term "ligno-" is defined in Latin as wood and that the term "lignin" is defined as an organic substance that, with cellulose, forms the chief part of a woody tissue. The Examiner then indicates uncertainty as to how cellulose has an active part in a fuel cell or "how a polyaniline becomes a cellulose."

In response to these assertions, Applicant respectfully urges that the terminologies cited by the Examiner are being used in the application in accordance with their generally accepted meanings. That is, Applicant does not intend that any meaning other than the generally accepted meanings should be ascribed to the terms "ligno-" and "lignin". It may be, as the Examiner asserts, that the terms have not heretofore been associated with the art to which the invention pertains. Applicant respectfully suggests, however, that such is frequently the nature of an invention, i.e. a combination of elements from two unrelated areas of art. Indeed, Applicant respectfully urges that the novelty of Applicant's claimed invention lies, at least in part, in the use of lignin-containing compositions as part of the electrocatalyst of the claimed fuel cell.

The Examiner has also noted the use of the trademarks TEFLON and NAFION in the specification and has indicated that, in addition to being capitalized, their use should be accompanied by the corresponding generic terminology. Applicant has amended the specification to provide the corresponding generic terminologies.

Claims 4 and 9 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicant respectfully traverses this rejection. The Examiner has indicated that the claim(s) contains subject

matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In support of this assertion, the Examiner cites the use of the term "ligno-", which the Examiner indicates is "defined in Latin for wood" and the term "lignin", which the Examiner indicates is defined as an organic substance that, with cellulose forms the chief part of a woody tissue. The Examiner then indicates that it is unclear as to how cellulose has an active part in a fuel cell or how polyaniline becomes a cellulose. Applicant is confused by these assertions of the Examiner and does not understand the relevance of these assertions to the rejection. The invention being claimed by Applicant is the use of these lignin-containing compounds as components of the electrocatalyst of a fuel cell. Applicant respectfully urges that a description of the mechanisms by which these materials are able to function is not required under 35 U.S.C. 112, first paragraph. Furthermore, in addition to describing the use of these lignin-containing materials, Applicant has provided an example showing how the materials are applied. Accordingly, Applicant respectfully urges that the subject matter of Claims 4 and 9 is sufficiently described in the subject application so as to satisfy the written requirement of 35 U.S.C. 112, first paragraph.

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Claims 4 and 9 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully traverses this rejection. The Examiner indicates that where an applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the Applicant intended to so redefine that claim term. The Examiner then goes on to indicate that the terms "ligno-" and "lignin" in claims 4 and 9 are used to mean "grafted", while the accepted meaning is "wood-like" and that the terms are, thus, indefinite because the specification does not clearly redefine the terms. Applicant respectfully disagrees. Claim 4 recites a proton conductive material which may include ligno-sulfonic acid, which, as evidenced by the information from ChemIndustry.com enclosed with this response, is a well-known material. Similarly, the pages from the online catalog of Sigma-Aldrich Chemical Company enclosed with this response clearly show that polyaniline grafted to lignin as claimed by Applicant is also a well-known material. Applicant respectfully urges that, regardless of the meaning which may be ascribed to the terms "ligno-" and "lignin", as they are components of materials which are well-known to those skilled in the art, their use is

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clear and in accordance with their ordinary meaning. Accordingly, Applicant respectfully urges that Claims 4 and 9 are, in fact, definite in accordance with the requirements of 35 U.S.C. 112, second paragraph.

The invention claimed by Applicant is a fuel cell comprising an anode electrode, a cathode electrode and a proton exchange membrane electrolyte disposed there between. An anode catalyst layer is disposed on the electrolyte facing surface of the anode electrode or the anode electrode facing surface of the electrolyte. The said anode catalyst layer comprises a proton conductive material and an electron conductive material substantially uniformly dispersed throughout the catalyst layer. The proton conductive material and/or the electron conductive material comprise lignin. In accordance with one embodiment of this invention, the lignin may be in the form of ligno-sulfonic acid. In accordance with an alternative embodiment of this invention, the lignin is part of a grafted polymer, e.g. polyaniline grafted to lignin. Applicant respectfully urges that the prior art relied upon by the Examiner for rejection of the subject application neither teaches nor suggests an anode catalyst layer comprising a proton conductive material and an electron conductive material substantially uniformly dispersed throughout the catalyst layer where the proton conductive material and/or the electron conductive material comprises lignin as claimed by Applicant.

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Claims 1-14 have been rejected under 35 U.S.C. 102(e) as being anticipated by Srinivas, U.S. Patent Publication No. 2004/0110051 A1 (hereinafter "the Srinivas publication"). This rejection is respectfully traversed. The Srinivas publication teaches a composition comprising particulate carbonaceous material and a sulfonated conducting polymer containing hetero atoms. Devices comprising the composition, which may include a metal, include supported electrocatalysts, membrane electrode assemblies and fuel cells. Applicant respectfully urges, however, that the Srinivas publication neither teaches nor suggests an anode catalyst comprising lignin as claimed by Applicant. Absent any teachings regarding the use of lignin as a component of an anode electrode catalyst, Applicant respectfully urges that the Srinivas publication does not anticipate the invention claimed by Applicant in the manner required by 35 U.S.C. 102(e).

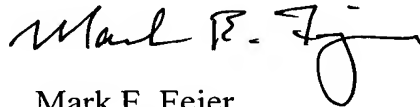
### **Conclusion**

Applicant intends to be fully responsive to the outstanding Office Action. If the Examiner detects any issue which the Examiner believes Applicant has not addressed in this response, Applicant urges the Examiner to contact the undersigned.

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Applicant sincerely believes that this patent application is now in condition for allowance and, thus, respectfully requests early allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark E. Fejer". The signature is fluid and cursive, with a large, stylized "F" and "J".

Mark E. Fejer  
Regis. No. 34,817

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